HUMAN ANTIBODIES AND FUSION PROTEINS THAT NEUTRALIZE HIV-1 ACTIVITY

SUMMARY

The National Cancer Institute seeks parties to license or co-develop human anti-HIV-1 domain antibodies for the treatment of HIV-1 and as methods to design vaccines for HIV-1 and cancer.

REFERENCE NUMBER

E-043-2008

PRODUCT TYPE

- Therapeutics
- Vaccines

KEYWORDS

- HIV-1
- CD4
- B-cell receptors

COLLABORATION OPPORTUNITY

This invention is available for licensing and co-development.

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DESCRIPTION OF TECHNOLOGY

NCI Cancer and Inflammation Program researchers developed multiple novel human anti-HIV-1 domain antibodies and their fusion proteins with two-domain or single-domain human soluble CD4 that can potentially be used alone or synergistically with other anti-HIV-1 antibodies and antiretroviral drugs as therapeutics and/or preventatives for infection by different HIV-1 strains.

The researchers have also developed a series of fusion proteins as vaccine immunogens that could elicit broadly neutralizing antibodies against HIV-isolates from different clades. One invention describes a vaccine composed of a primary immunogen and a secondary immunogen, and a method for making the vaccine that could elicit desired broadly neutralizing antibodies. The primary immunogen could be effective in activating B cell receptors (BCRs) that are on the maturational pathways of the desired antibodies and have an intermediate degree of somatic mutational diversity. The secondary immunogen contains epitopes of the desired antibodies and could further diversify the BCRs to form mature BCRs

that have the identical or substantially identical sequences as the desired antibodies.

POTENTIAL COMMERCIAL APPLICATIONS

- Treatment and prevention of HIV-1 infections.

COMPETITIVE ADVANTAGES

- Elicit broadly neutralizing antibodies against HIV-1 isolates from different clades
- Potentially elicit antibodies that are not regulated by tolerance mechanisms
- May also be used for designing vaccines for cancer treatment
- Relative small sample size allows for potential penetration into lymphoid tissue

INVENTOR(S)

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DEVELOPMENT STAGE

- Pre-clinical (in vivo)

PUBLICATIONS

1. Chen W, et al. Engineered single human CD4 domains as potent HIV-1 inhibitors and components of vaccine immunogens. J Virol 2011; 85:9395-405.
2. Chen W, et al. Bifunctional fusion proteins of the human engineered antibody domain m36 with human soluble CD4 are potent inhibitors of diverse HIV-1 isolates. Antiviral Res 2010; 88: 107-15.

PATENT STATUS

- **U.S. Issued:** US Patent 9,181,327 (10 November 2015)
- **Foreign Filed:** EP 2238165 (13 Oct. 2009)

RELATED TECHNOLOGIES

- E-322-2008 - Novel Method Of Preparing Vaccines
- E-103-2010

THERAPEUTIC AREA

- Cancer/Neoplasm
- Infectious Diseases